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ABSTRACT

This study compared the effectiveness of distance education versus on-campus education, as measured by pre- and post-tests, differences in final exam scores and final course grades, age, and preferred learning styles. Learning style preferences were determined by the Canfield Learning Styles Inventory. Participants included 47 undergraduate students enrolled in a business communications course at a North Carolina university; 23 students were enrolled in the traditional on-campus class and 24 students in the distance education class. Both groups had the same instructor and studied the same course content in the same time frame; classes differed in terms of scheduling, accessibility to the instructor, and instructional media and method. The study found no significant differences between pre-test scores and final course grades. However, analysis revealed significant differences in post-test scores, final exam scores, and students' age, with distance education students (who were on average older than traditional students) having higher post-test scores and higher final exam scores. No differences were observed in final course grades. Analysis of learning style preferences found a preference for organization and detail in both groups; the least preferred style for traditional students was independent, and for distance students, the least preferred style was authority. (Contains 16 references.) (CH)

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Assessing the Effectiveness of

Distance Education versus Traditional On-Campus Education

Introduction

Today, approximately 13 million people are enrolled in distance education (Thomas, 1999). This number will no doubt increase as we enter the 21st Century. Distance education is an alternative method of course delivery being used by colleges and universities nationwide. It has become an avenue that fosters new partnerships among community colleges and universities. Distance education addresses the needs of adult learners who are working adults with career and family responsibilities. It is also an avenue that assists, in part, with the teacher shortage issue. Teachers who are required to take courses for recertification now have the option of taking courses on-line. This helps save traveling time, and courses are available that more conveniently fit into hectic schedules.

Distance education occurs when teachers and students are separated by physical distance, and technology is used to bridge the instructional gap (Willis 1993). With distance education, the instructor is removed from direct, immediate, physical contact with students. This creates a learning environment as well as circumstances that are different from traditional, face-to-face educational settings (Hassenplug & Harnish 1998).

While distance education has become a popular alternative to the traditional face-to-face educational setting, controversy surrounds its effectiveness. Political and public interest in distance education and its effectiveness has become a subject of debate. Research indicates that distance education can be as effective as traditional face-to-face instruction when the methods and technologies used are appropriate to the instructional tasks, when there is student-to-student interaction, and when teacher/student feedback is timely (Verduin & Clark 1991). Studies have

suggested that students enrolled in distance education courses earned higher grades than did traditional students (Gubernick & Ebeling, 1997; Heines & Hulse, 1996; Hogan, R. 1997; Kabat & Friedel, 1990; Puzzuoli, 1970; Schutte, 1996; Souder, 1993). However, other researchers have contended that there are no significant differences in grades for distance education students versus traditional students (McKissack, 1997; Mortensen, M. H., 1995; Freeman 1995). Thus, distance education is viewed as being effective by some, yet in the eyes of others, it is viewed as something less than education (Spooner, F., Jordan, L., Algozzine, B., & Spooner, M., 1999).

Purpose of The Study

This study tested the effectiveness of distance education by comparing traditional and distance teaching and learning in business communications. This study sought to determine whether there was a significant difference in subject matter knowledge as measured by a pretest and post-test between students taught using the distance education format and students taught using the traditional face-to-face format. This study also sought to determine whether there was a significant difference in final exam scores, final course grades, age, and preferred learning styles between the two groups.

Methodology

A quasi-experimental research design was used to collect data for the study. The course, Business Communications, was a three-credit undergraduate class at a university in eastern North Carolina. The course was designed to develop an understanding of the need for effective communications in business. Application of basic principles of written communications was utilized to solve specific business problems. Forty-seven undergraduate students were enrolled in the class: twenty-three students were enrolled in the traditional on-campus class, 24 students were enrolled in the distance education class.

Both classes had the same instructor, studied the same course content, used the same course materials, completed the same assignments, were allotted the same time frame for completion of assignments, and took the same achievement tests (pre-test, post-test, final exam). The classes differed in terms of scheduling, accessibility to instructor, instructional media, instructional method, and class location. Instructional media used in the traditional class included computers, PowerPoint presentations, transparencies, and overheads. ECU's distance education course offering resulted from collaboration with Denver-based RealEducation, Inc., a provider of distance education solutions over the Internet. Through the RealEducation system, students could download all course content including audio, video, slide shows and other Internet technology.

The instructional method used with the traditional class was the traditional lecture. Lecture notes for the distance education class were in the form of audio links and written notes. Both classes were able to contact the instructor by telephone, electronic mail, by appointment, during office hours, and by FAX. The traditional class handed in their assignments. The distance education class submitted their assignments as an attachment to e-mail. Instructor feedback on the assignments was made with a color ink pen for the traditional class; feedback for the distance education class was typed within the original attached paper using a different color font. Both classes were required to participate in class discussions. The traditional class participated orally. The distance education class participated via electronic threaded discussions that allowed the entire class to read each other's point of view on a given topic.

To obtain learning styles of the students, the Canfield Learning Styles Inventory was used. The Inventory is divided into four major categories: Conditions for Learning (Peer, Organization, Goal Setting, Competition, Instructor, Detail, Independence, Authority); Area of

Interest (Numeric, Qualitative, Inanimate, People), Mode of Learning (Listening, Reading, Iconic, Direct Experience), and Expectation for Course Grade (A, B, C, D, and Total Expectation). The A- to D-Expectation scales reflects the level of performance anticipated (Canfield, 1977).

Findings

To determine whether distance education is as effective as traditional face-to-face education, this study examined pre-test and post-test scores, final exam scores, final course grades, age, and preferred learning styles of both groups of students. Means, standard deviations, and t statistics were obtained for the traditional class and the distance education class. Results indicated that there was no significant difference at the .05 alpha level between the two groups with regard to pre-test scores and final course grades. However, significant differences were found at the .05 alpha level for post-test scores, final exam scores, and age. The following research questions were addressed:

Is there a significant difference between traditional on-campus students and distance education students on pre-test scores? A pre-test, composed of 50 multiple-choice questions, was given as an in-class test at the beginning of the semester for both groups. Distance education students performed the best with a mean score of 59.21 (55.52 for traditional students) and they had the lowest inter-student variation - S.D. 9.96 (13.50 for traditional students). However, t-test results revealed that there were no significant differences between the pre-test scores of the two groups. The F-ratio of .291 was not significant at the .05 alpha level. This data may suggest that the two groups were similar in knowledge of course content at the beginning of the semester.

Is there a significant difference between traditional on-campus students and distance education students on post-test scores? A post-test was given near the end of the semester. T-test results revealed that there were significant differences between the post-test scores of the two groups. The distance education students scored higher than the traditional students on the post-test. The F-ratio of .026 was significant at the .05 alpha level. Distance education students had a mean score of 72.43 (65.55 for traditional students) and a standard deviation score of 9.12 (10.91 for traditional students).

Is there a significant difference between traditional on-campus students and distance education students on final exam scores? The final exam consisted of true/false questions ($1/4^{th}$ of the test) and multiple-choice questions (3/4ths of the test). The multiple choice questions were designed as case scenarios or situations that required students to apply the knowledge learned throughout the course in order to provide the correct answers. T-test results showed that there was a significant difference at the .05 alpha level between final exam scores. The distance education students scored higher than the traditional students on the final exam. The F-ratio of .017 was significant. Distance education students had a mean score of 85.92 (78.26 for traditional students) and a standard deviation score of 8.16 (12.63 for traditional students).

Is there a significant age difference between the traditional on-campus students and distance education students? There was a significant difference in students' age for both groups. The F-ratio of .000 was significant at the .05 alpha level. The mean score for distance education students was 37.79 (23.13 for traditional students) and the standard deviation score was 8.72 for distance education students (5.12 for traditional students).

Is there a significant difference between traditional on-campus students and distance education students on final course grades? T-test results denoted no significant difference in final course grades for both groups. The F-ratio of .263 was not significant at the .05 alpha level. Distance education students had a mean score of 85.42 (80.57 for traditional students) and a standard deviation score of 13.11 (16.16 for traditional students). The final course grade is a better indicator of students' course performance as opposed to the test measures. The final course grade incorporated test scores, homework assignments, class discussions, as well as project assignment scores. Although there were statistically significant differences between the distance education students and the traditional students on post-test scores, final exam scores, and age, there was no statistically significant difference between these two groups on the final grade.

Is there a significant difference between preferred learning styles as measured by the Canfield Learning Styles Inventory among traditional on-campus students and distance education students?

In the category of **Conditions for Learning**, the most preferred scale for both groups was **Organization.** The group mean for traditional students was10.45, 10.25 for distance education students. Learners who prefer **Organization** desire well-organized course work, meaningful assignments, as well as a logical sequence of activities. They need to know why things occur in a given order and manner. Material must be covered logically and systematically. Learners who prefer organization appreciate and work well with lecture note outlines, course outlines, chapter outlines, and topical outlines. They are likely to receive well-organized presentations that are presented without diversion into unrelated topics. The least preferred scale in this category for traditional students was **Independent** with a group mean of

19.13. This scale is favored by students who like to work alone. They like to determine their own study plan, decide how they want to study, and how they want to do things. They prefer the personal freedom to develop the ways and means to accomplish their goals. The least preferred scale in this category for distance education students was **Authority** with a group mean of 18.70. They tend not to like classroom discipline, maintenance of order.

In the category of **Area of Interest**, the most preferred scale for traditional students was **Inanimate** with a group mean of 12.59. They like working with things--building, repairing, designing, and operating. The most preferred scale for distance education students was **People** with a group mean of 13.95. They enjoy activities that involve working with others. Both groups least preferred the **Numeric** scale with a group mean of 18.81 for traditional students, 17.40 for distance education students.

In the category of **Mode of Learning**, the most preferred scale for traditional students was **Iconic** with a group mean of 12.00. They like interpreting movies, slides, and illustrations. The most preferred scale for distance education students was **Direct Experience** with a group mean of 11.35. They like to directly contact the materials, topics, or situations being studied. They like working with something tangible. The least preferred scale for traditional students was **Reading** with a group mean of 18.81. **Reading** is favored by students who learn through studying printed materials, books, articles, magazines and pamphlets. They may be uncomfortable in a lecture environment. The least preferred scale for distance education students was **Listening** with a group mean of 17.50. They do not like listening to lectures, tapes, and speeches.

In the category of **Expectation for Course Grade**, both groups most preferred **B-expectation** with a group mean of 10.50 for traditional students and 9.35 for distance education

students. Both groups least preferred **D-expectation** with a group mean of 21.77 for traditional students and 23.15 for distance education students. This scale represents the level of performance anticipated. Students select the grade they think they will receive. Learners who select the **B-Expectation** scale expect to perform at an above-average level in a learning situation, but not necessarily at a superior level. They are more likely to expect to be in the top 25 to 33%. Learners who select the **D-Expectation** scale expect to do poorly or fail.

Conclusions

As the number of people enrolled in distance education increases, it is important that research be done to determine if, in fact, distance education is an effective alternative to traditional face-to-face education. The major goal of this study was to determine whether distance education was as viable an alternative method of course delivery as traditional on-campus education. Results of this study indicated that distance education can be just as effective as traditional face-to-face education in business communications. No significant differences existed between pre-test scores and final course grades. However, analysis of data revealed that there were significant differences between the distance education class and the traditional class with regard to post-test scores, final exam scores, and students' age. Distance education students scored higher on post-test scores and had higher final exam scores. Students in the distance education course were on average older than students in the traditional class. The average age of the traditional students was 23, average age of distance education students was 38. No significant differences were observed between the groups when total semester weighted scores in the form of final grade averages were used as the indicator of achievement. Thus, there is insufficient evidence to conclude that one method of course delivery is less effective than the other.

As measured by the Canfield Learning Styles Inventory, both the traditional students and distance education students preferred **Organization** and **Detail.** However, the traditional students preferred **Inanimate** (working with things) and **Iconic** (interpreting illustrations, movies, slides, graphs, etc.). Distance education students preferred **People** (prefers working with people) and **Direct Experience** (desires hands-on or performance situations). The traditional students least preferred **Independence** (working alone, doing things independently). Distance education students least preferred **Authority** (classroom discipline, maintenance of order).

This study concurs with the general body of knowledge that students taking courses through distance education perform as well as and in some cases better than students in the traditional classroom. However, caution should be used when interpreting these results. Distance education students scored higher on the post-test and the final exam, but this is not sufficient evidence to conclude that distance education is superior to traditional face-to-face education. Other factors may have contributed to these results, for example, the distance education delivery method catered, in part, to the students' preferred learning styles. Since the average age of distance education students was 38, their learning styles may have been mediated as a result of life experiences. These students least preferred the **Authority** condition for learning. The structure of the class allowed them the freedom to work **Independently** on the course material. They also preferred **Direct Experience** and the structure of the course allowed for considerable hands-on experience in learning the course content of business communications.

Recommendations for Further Research

The issues surrounding the use of distance education via the Internet as an alternative method of course delivery is an important issue that warrants further study. A study that uses identical courses taught within the same semester should be repeated over the course of time to

determine if research results are consistent. Distance education students showed a learning style preference for the **People** scale as measured by the Canfield Learning Styles Inventory. A study should be conducted that investigates the impact of incorporating collaborative assignments, teamwork assignments within the distance education course. Finally, this study should broaden to include attitudinal information and evaluations of both the course and the instructor.

Summary

This study adds to the growing body of research regarding the effectiveness of distance education. It is important to note that there were no significant differences between pre-test scores and final course grades. Lack of a significant difference in final course grades may be an indication that one delivery method is not superior to the other. Thus, this study can conclude that while distance education may not be superior to traditional face-to-face education, it can be an acceptable alternative to traditional face-to-face education.

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